

CLAIMS

1-24. (Cancelled)

25. (Previously presented) An optoelectronic module comprising:

a substrate defining a stepped upper surface having a lower and an upper portion, the substrate being configured such that a lower surface thereof determines a footprint of the module;

a thermo-electric cooler disposed on the substrate and having a top portion including a flat top surface, the flat top surface making an entire top surface of the top portion and being substantially parallel to the lower surface of the substrate, the thermo-electric cooler further being disposed on the lower portion of the stepped surface;

a laser light source disposed on the flat top surface of the top portion of the thermo-electric cooler such that the thermo-electric cooler is disposed between the substrate and the laser light source, wherein the thermo-electric cooler is further thermally coupled to the laser light source to cool the laser light source;

an electrical connection extending from the upper portion of the upper surface of the substrate to the laser light source; and

a laser light control device disposed on the upper portion of the stepped surface of the substrate, the electrical connection electrically coupling the laser light control device to the laser light source.

26. (Previously presented) The module of claim 25, further comprising a structure defining an enclosed environment and including the substrate, wherein:

the substrate is at least partially disposed in the enclosed environment; and

the thermo-electric cooler, the laser light source and the electrical connection are disposed in the enclosed environment.

27. (Cancelled)

28. (Previously presented) The module of claim 25, wherein the laser light control device includes at least one of a driver and an amplifier.

29. (Previously presented) The module of claim 25, wherein the thermo-electric cooler includes a plurality of elongated thermo-electric elements and a bottom portion, the thermo-electric elements being disposed substantially in parallel between the top portion and the bottom portion of the thermo-electric cooler, the top planar surface being substantially orthogonal to the thermo-electric elements.

30. (Cancelled)

31. (Previously presented) The module of claim 25, wherein the laser light source is disposed directly on the thermo-electric cooler.

32. (Previously presented) The module of claim 25, wherein the substrate includes a substrate body and plurality of vias extending through the substrate body, the vias being electrically connected by way of the substrate body to the thermo-electric cooler and adapted to dissipate thermoelectricity from the thermo-electric cooler.
33. (Previously presented) The module of claim 25, wherein the thermo-electric cooler and the upper portion of the stepped surface are disposed such that the upper portion is substantially co-planar with the flat top surface of the thermo-electric cooler.
34. (Previously presented) The module of claim 25, wherein the substrate includes a substrate body comprising a one-piece component.
35. (Cancelled)
36. (Previously presented) The module of claim 25, wherein the substrate includes a substrate body and a plurality of vias extending through the substrate body, the vias being electrically connected by way of the substrate body to the laser light control device.
37. (Previously presented) The module of claim 25, wherein the laser light source emits light bundles in a direction substantially parallel with a top surface of the thermo-electric cooler, the module further including an optical device disposed on the substrate and adapted to redirect the light bundles from the direction substantially parallel with the top surface of the thermo-

electric cooler to a direction that is substantially orthogonal to the top surface of the thermo-electric cooler.

38. (Previously presented) The module of claim 37, wherein the optical device includes at least one of a mirror assembly and prisms.
39. (Previously presented) The module of claim 37, wherein the optical device is disposed on the thermo-electric cooler.
40. (Previously presented) The module of claim 25, wherein the substrate includes a ceramic material.
41. (Previously presented) The module of claim 25, wherein the thermo-electric cooler comprises a T-shaped bottom portion.
42. (Previously presented) The module of claim 25, wherein the laser light source comprises one of a vertical cavity surface-emitting laser device, a Fabry-Perot laser device, a distributed feedback laser device, and a laser diode device.
43. (Previously presented) The module of claim 26, further including a cap partially defining the enclosed environment, the cap being disposed on the substrate.
44. (Previously presented) The module of claim 43, further comprising an overhanged ring disposed on a perimeter of the substrate and supporting the cap thereon.

45. (Previously presented) The module of claim 43, wherein the cap includes an optical window adapted to facilitate an exit of laser light bundles from the enclosed space.
46. (Previously presented) The module of claim 45, wherein the optical window includes one of a flat glass window, a ball lens, an aspherical lens, and a GRIN lens.
47. (Previously presented) The module of claim 26, further comprising a laser light control device disposed on the upper portion of the stepped surface of the substrate and in the enclosed environment, the electrical connection electrically coupling the laser light control device to the laser light source, wherein:

the substrate includes a substrate body and:

a plurality of first vias extending through the substrate body, the first vias being electrically connected by way of the substrate body to the thermo-electric cooler and adapted to dissipate thermoelectricity from the thermo-electric cooler; and

a plurality of second vias extending through the substrate body, the second vias being electrically connected by way of the substrate body to the laser light control device.